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DRAWINGS ATTACHED

1 204 423

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(54) CATALYTIC OXIDATION UNIT

(71) We, MOFFATS LIMITED, of 23 Dennison Road East, Weston, Ontario, Canada, a comany organized and existing under the laws of Canada do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:

The present invention relates to what might broadly be termed a catalytic oxidation unit which is useful in treating hot gaseous products to reduce smoke, odour and other undesirable properties present in the hot gases as they pass through the unit.

The invention has particular application to the vent for an oven in a cook stove which oven is of the kind in which food soil may be cleaned from the walls thereof by pyrolytic action at an elevated temperature.

In recent years, the cook stove industry has developed an oven wherein food soil may be cleaned from the oven walls by pyrolytic action which takes place under oxygen-starved conditions in a temperature range lying somewhere between 800°F and 1000°F. The pyrolytic action taking place within the oven under these temperatures is oxygen-starved combustion proceeding at a relatively slow pace and generating gaseous products which are vented from the oven through an appropriate passage.

The gaseous products formed in the oven are frequently incompletely oxidized and would emerge in the form of smoke and having, at least in some instances, an objectionable odour.

It is an object of the present invention to provide a device which will serve as a vent for the gaseous products developed during the pyrolytic oven cleaning cycle and which will complete the oxidation of the gaseous products as they pass therethrough so that the gaseous products emerge into the ambient atmosphere as a colourless, odourless gas.

It is a further object to provide a cook stove incorporating such a unit.

According to the invention there is provided a catalytic oxidation unit adapted to form an oven exhaust vent, comprising a substantially straight tube adapted to extend upwardly from the oven and allow escape of gases from the oven cavity therethrough, said tube being made of resiliently deformable material and being split in an axial direction so that its cross sectional size is resiliently adjustable, and including a catalytic oxidation element removably secured within the tube.

The present invention will be described in detail with reference to the accompanying drawings in which:

Figure 1 is a perspective view, partly cut away and partly exploded showing a catalytic oxidation unit constructed in accordance with the present invention, and

Figure 2 is a section view along line 2-2 in Figure 1 and showing the exploded components in the assembled position.

Referring now to Figure 1, the catalytic oxidation unit or smoke eliminator is shown in the environment of the upper portion of a domestic cook stove. Such a cook stove embodies an oven cavity which is defined by a liner, the upper wall of which is shown in Figure 1 at reference numeral 10. The oven liner is secured by a lap welded seam 11 to a front frame 12 which, together with a retaining panel 13 forms an insulating cavity and retains an insulating blanket 14 of glass fiber material or the like in a position surrounding the oven cavity. Although specific details of the stove construction are not directly relevant to the present invention, it is convenient to observe that the panel 13 is secured to the front frame 12 through the intermediary of an angle bracket 15. Panel 13 is provided with an up-

[Price 5s. 0d. (25p)]

turned lip 16, extending continuously thereabout so that the panel 13 is, in fact, a large, shallow pan. The front frame 12 is provided with a forwardly extending flange 17 to which the rearwardly extending flange 18 of the stove top assembly 19 may be secured. In a conventional manner, the stove top asembly 19 is provided with a plurality of apertures 20 which are adapted to receive burner pans 21 within which, in a conventional manner, are mounted heating elements which, for convenience, are not shown in the drawings. The burner pans are provided with a centrally disposed aperture, as shown.

The top wall 10 of the oven liner is provided with an aperture 21 defined by a low, upstanding, peripheral wall 22 which is formed from the material of the wall 10 when the aperture 21 is punched therein. Circumferentially spaced tabs 23 are provided, integrally formed with the wall 22 and the upper ends 24 of the tabs 23 are bent over, as shown, to partially extend across the opening 21 formed in the wall 10 of the oven liner.

In vertical alignment with the aperture 21 is an aperture 25 formed in panel 13, aperture 25 being also surounded by a low peripheral wall 26. Apertures 21 and 25 which are in vertical alignment with one another are also in vertical alignment and co-axial with aperture 20 in the stove top assembly 19.

A split tubular element 27 is provided consisting of a sheet-metal member formed into a cylindrical tube, having adjacent edges 28 and 29 simply abutting one another without being secured to each other.

The external diameter of the peripheral wall 22 is slightly less than the internal diameter of the tube 27 and the internal diameter of the low peripheral wall 26 is slightly greater than the external diameter of the tube 27 so that the tube 27 may, as shown, pass through aperture 25 and embrace the wall 22 in the upper wall 10 of the oven liner.

Intermediate its ends, the tube 27 is provided with annular ribs or corrugations. Specifically, an annular rib 30 is provided in a position such that when the tube 27 is in the position shown in Figure 1, it will lie immediately below panel 13 and, being larger than the internal diameter of the aperture 25, will retain the tube 27 in position.

In order to insert the tube 27 into the structure shown in Figure 1, one of the edges 28 and 29 is pressed radially inwardly of the other edge and the tube is then squeezed so as to resiliently reduce its diameter so that it may be inserted through opening 25 in wall 13. As the tube 27 is inserted, the lower end is allowed to resiliently resume its circular configuration so that it may embrace the wall 22 and, once it has seated upon wall 10, of the oven liner, the upper end is then allowed to expand to its circular configuration so as to be retained in position by the interference between rib 30 and aperture 25.

When the tube 27 has been inserted as shown in Figure 4, a catalytic oxidation element, of cylindrical configuration and of a cross sectional size to fit the internal cross section of tube 27, and indicated by reference character 31 is placed in the tube and allowed to slide to the bottom to be supported upon tabs 24 as shown in Figure 2.

The catalytic oxidation element 31 while it specifically forms no part of the present invention, has been found to be satisfactorily provided by a ceramic honeycomb material of the kind sold under the trade mark "TORVEX" by E. I. du Pont de Nemours and Company of Wilmington, Delaware, United States of America. This ceramic honeycomb material is pervious to the flow of gases from the interior of the oven. The catalytic oxidizing action of the unit 31 is provided by a platinum catalytic coating of a kind which may be obtained from Messrs. Johnson, Mathey & Co. Limited, 73-83 Hatton Garden, London, England.

Both the ceramic material specifically identified and the platinum coating referred to, however, are illustrative of the kind of catalytic oxidation element which is contemplated and the present invention is not intended to be limited thereto.

The catalytic oxidation element 31 is retained in position by a spring clip 32 comprising a spring member of generally U-shaped configuration having legs 33 and 34 provided at their free ends, with tabs 35 and 36. The "at rest" separation between tabs 35 and 36 is greater than the internal diameter of the tube 27 and the tube 27 is provided, as can be seen in both Figures 1 and 2, with at least one and preferably two internal annular grooves 37 and 38 into which tabs 35 and 36 may seat when the spring retaining clip 32 is in position. Two grooves 37 and 38 are normally provided so that the tube 27 may be adapted to firmly retain an oxidation element 31 of at least two alternative sizes.

From the foregoing description it will be apparent that a device of the kind described has been provided which is extremely simple in construction, economical to manufacture and which can be assembled in the surrounding structure of a cook stove with a high degree of simplicity.

WHAT WE CLAIM IS:—

1. A catalytic oxidation unit adapted to form an oven exhaust vent, comprising a substantially straight tube adapted to ex-

tend upwardly from the oven and allow escape of gases from the oven cavity therethrough, said tube being made of resiliently deformable material and being split in an axial direction so that its cross sectional size is resiliently adjustable, and including a catalytic oxidation element removably secured within the tube.

2. A unit as claimed in claim 1, wherein the tube is a sheet-metal member formed into a cylindrical tube with adjacent edges abutting one another without being secured to each other.

3. A unit as claimed in claim 2, wherein the tube is provided with at least one radial projection for engagement with formations on the oven structure.

4. A unit as claimed in claim 3, wherein the tube is adapted to extend from a part provided in the upper wall of the oven liner, through a vertically aligned part in the upper retaining panel of an insulation cavity above the oven, and up to a co-axial aperture in the stove top assembly.

5. A unit as claimed in claim 4, wherein the catalytic oxidation element substantially coincides in cross sectional shape and size with the internal cross section of the tube, and is located adjacent the bottom end of the tube.

6. A unit as claimed in claim 5, wherein a spring clip removably secures the catalytic oxidation element in position, said spring clip being generally U-shaped, each leg thereof being provided with outwardly extending tabs engaging one of a plurality of annular grooves provided in the internal surface of the tube.

7. A cook stove including an oven cavity, an oven liner, an insulating cavity, a stove top provided with burner pans, and an exhaust vent for the oven, said exhaust vent including a catlytic oxidation unit comprising a substantially straight tube extending from an aperture in the upper wall of the oven liner to an aperture in the stove top, said tube being made of resiliently deformable material and being split in an axial direction so that its cross sectional size is resiliently adjustable, and including a catalytic oxidation element removably secured within the tube.

8. A stove as claimed in claim 7, wherein the aperture in the stove top is located at the centre of a burner pan.

9. A stove as claimed in claim 8, wherein the aperture in the upper wall of the oven liner is defined by a low upstanding peripheral wall over which the lower end of the tube fits, said wall being provided with inwardly extending tabs for reception of the catalytic oxidation element.

10. A catalytic oxidation unit substantially as hereinbefore described with reference to an as illustated in the accomference to and as illustrated in the accompanying drawings.

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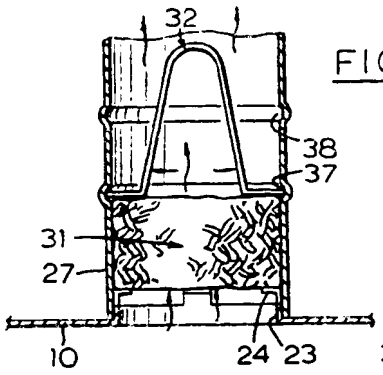
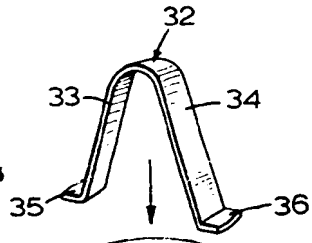
1,204,423 COMPLETE SPECIFICATION
1 SHEET

This drawing is a reproduction of the Original on a reduced scale.

FIG. 2





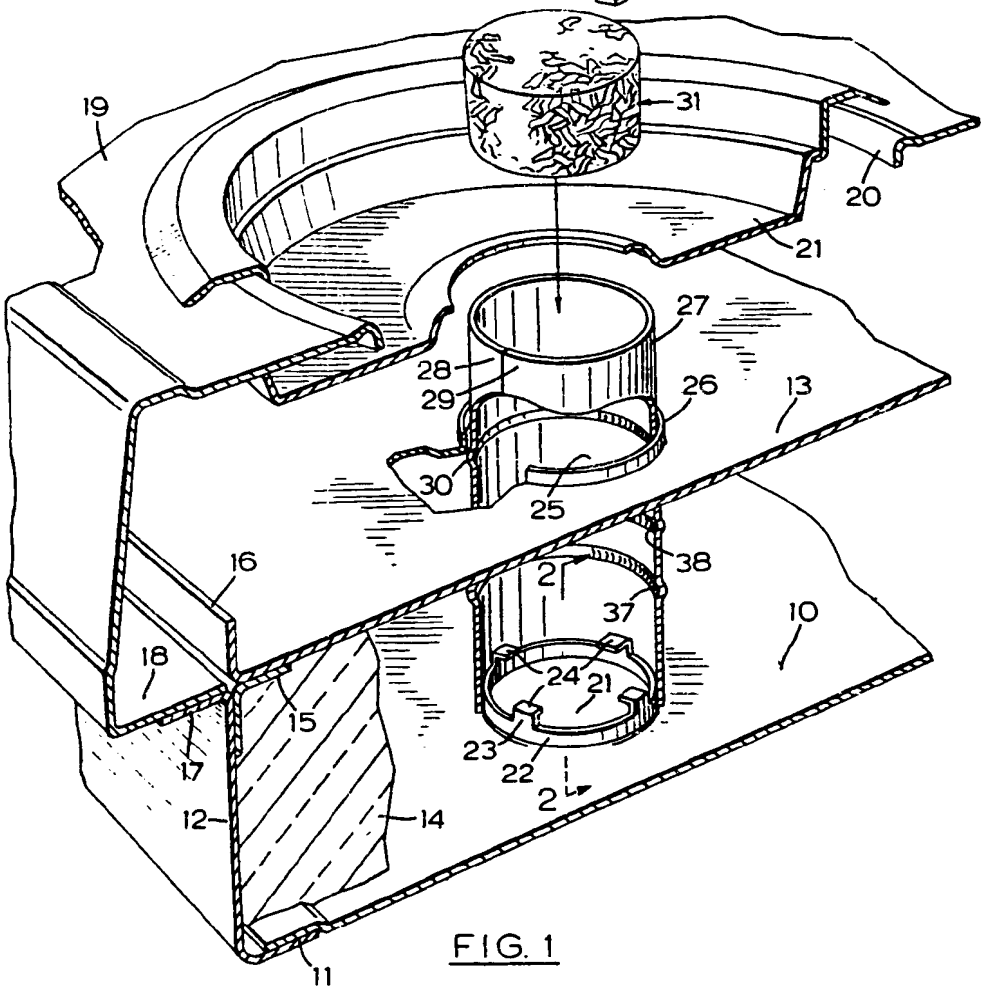


FIG. 1